Sweat rate and sweat sodium concentration in summer daily life

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Purpose: The present study was carried out to investigate the sweat rate and sweat sodium concentration in summer daily life.

Methods: The subjects were 53 healthy men and 42 healthy women aged between 20 and 63 years. They were measured for body mass loss, chest sweat rate, and sweat sodium concentration during walking, commuting, aerobics, and sleeping on a summer day. Sweat rate was measured by filter paper method, sweat sodium concentration was measured with atomic absorption spectrophotometry.

Results: Chest sweat rate and sweat sodium concentration were the highest during aerobics, and following in decreasing order, walking, commuting, and sleeping. Correlation was recognized between total chest sweat rate and sweat sodium volume during walking, commuting, aerobics. The slope of the regression line which shows sodium concentration in sweat was 5–20 (mean12.9) meq/L. Correlation was recognized between sweat loss and sweat sodium volume during sleeping and the slope of the regression line was 2–5 meq/L.

Conclusions: These results suggest that sweat sodium concentration varies in the condition of the daily life.

Key words: sweat rate, sweat sodium concentration, daily life, atomic absorption spectrophotometry

Relationship between sweat sodium and plasma aldosterone concentration during exercise in a hot environment

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Purpose: To clarify the factors causing an individual difference in sweating rate and sweat sodium concentration, we analyzed the cross-sectional relationship between sweat sodium and plasma aldosterone concentration during rest and exercise in a hot environment.

Methods: Twelve college-aged male subjects with a mean maximal oxygen uptake of 48 ml·kg⁻¹ performed three sessions of 20 min-cycle exercise at two levels of intensity (40% and 60% VO₂max) in a room maintained at 31 °C. Local sweat samples were collected by capsules on the chest at 5-min intervals using the filter paper method during the exercise period, and sweat sodium concentration was measured by atomic absorption spectrometry. Blood samplings were taken from the antecubital vein at rest and the end of each exercise session, and plasma aldosterone concentration was measured by radioimmunoassay.

Results: Chest sweat rate (CSR) and sweat sodium concentration (CSNa) were higher and an individual difference in CSR and CSNa was greater at 60% exercise than at 40% exercise. In each individual, the CSNa increased significantly with the increase in CSR. In all subjects, mean CSNa correlated negatively with resting plasma aldosterone (ALD) at either level, but did not correlate with exercising ALD.

Conclusions: These results suggest that individual differences in the increase of CSNa in response to a rise in CSR is more related to resting ALD than to exercising ALD.

Key words: Chest sweat rate, Individual difference, Atomic absorption spectrometry, Filter paper method, Radioimmunoassay